CLAIMS

1. A method for inhibiting or reducing the growth of a cell comprising,

administering a dose of a telomere damage-inducing agent to the cell; and

administering a dose of a telomerase inhibitory agent to the cell, such that an inhibition or reduction in the growth of the cell is achieved.

2. A method for inhibiting or reducing the growth of a cell comprising,

obtaining an agent selected from the group consisting of a telomere damage-inducing agent and a telomerase inhibitory agent;

administering a dose of a telomere damage-inducing agent to the cell; and

administering a dose of a telomerase inhibitory agent to the cell, such that an inhibition or reduction in the growth of the cell is achieved.

3. The method of any one of claims 1 or 2, wherein said growth is aberrant.

4. The method of any one of claims 1 or 2, wherein said cell is a tumor cell.

5. The method of any one of claims 1 or 2, wherein said cell is a leukemic cell.

6. The method of claim 4, wherein said tumor cell is of the brain, breast, ovary, testes, bladder, prostate, colon, lung, liver, pancreas, or uterus.

7. The method of claim 4, wherein said tumor cell is benign.

8. The method of claim 4, wherein said tumor cell is malignant.

9. The method of any one of claims 1 or 2, wherein said growth is selected from the group consisting of hyperplastic and hypertrophic.

10. The method of any one of claims 1 or 2, wherein said inhibition or reduction in the growth of the cell comprises apoptosis.

11. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent and telomerase inhibitory agent are administered serially.

12. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent and telomerase inhibitory agent are administered concurrently.

13. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent and telomerase inhibitory agent are administered in any order.

14. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent or telomerase inhibitory agent is administered as a timed-release formulation.

15. The method of claim 14, wherein said telomere damage-inducing agent and telomerase inhibitory agent are both administered as a timed-release formulation.

16. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent or telomerase inhibitory agent is administered locally.

17. The method of claim 16, wherein said telomere damage-inducing agent and telomerase inhibitory agent are both administered locally.

18. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent or telomerase inhibitory agent is administered systemically.

19. The method of claim 18, wherein said telomere damage-inducing agent and telomerase inhibitory agent are both administered systemically.

20. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent or telomerase inhibitory agent is administered regionally.

21. The method of claim 20, wherein said telomere damage-inducing agent and telomerase inhibitory agent are both administered regionally.

22. The method of any one of claims 1 or 2, wherein said cell is in a human.

23. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent is paclitaxel, or a derivative thereof.

24. The method of any one of claims 1 or 2, wherein said telomerase inhibitory agent is a nucleotide analog, or derivative thereof.

25. The method of any one of claims 1 or 2, wherein said telomerase inhibitory agent is an antisense nucleic acid corresponding to a telomerase.

26. The method of claim 24, wherein said nucleotide analog is AZT.

27. The method of claim 24, wherein said nucleotide analog is d4T.

28. The method of any one of claims 1 or 2, wherein said telomere damage-inducing agent or said telomerase inhibitory agent, is administered as a subtherapeutic dose.

29. A method of identifying an agent that inhibits or reduces the growth of a cell by inducing telomere damage in said cell comprising,

contacting a cell with an agent; and

determining if telomere damage has occurred to identify thereby an agent that inhibits or reduces growth of a cell.

30. A method of identifying an agent or agents that inhibits or reduces the growth of a cell comprising,

contacting a cell with at least one agent and determining if telomere damage has occurred; and

contacting a cell with the same or at least one other agent and determining if a reduction in telomerase activity has occurred, whereby an agent or agents, alone or in combination, that are determined to induce telomere damage and inhibit telomerase activity, are indicated as an agent or agents that inhibits or reduces the growth of a cell.

31. An agent or agents identified according to the method of claim 30.

32. A pharmaceutical composition comprising an agent or agents identified according to the method of claim 30, and a pharmaceutically acceptable carrier.

33. A method of inhibiting or reducing the growth of a cell comprising,

administering to a cell a therapeutically effective amount of an agent or agents identified according to the method of claim 30.

34. A method of treating aberrant cell growth in a mammal comprising,

administering to a mammal a therapeutically effective amount of an agent or agents identified according to the method of claim 30.

35. The method of claim 34 wherein said mammal is a human.

36. A composition suitable for inhibiting or reducing the growth of a cell comprising,

a therapeutically effective amount of telomere damage-inducing agent; and

a therapeutically effective amount of telomerase inhibitory agent.

37. An article of manufacture comprising,

a vial containing a purified telomere damage-inducing agent and a purified telomerase inhibitory agent; and

instructions for use.

38. The article of claim 37, wherein said purified telomere damage-inducing agent and purified telomerase inhibitory agent are packaged in separate vials.

39. The method of claim 37, wherein said purified telomere damage-inducing agent and purified telomerase inhibitory agent are formulated in a pharmaceutically-acceptable carrier.

40. A method of treating cancer in a patient comprising,

administering a therapeutically-effective amount of a telomere damage-inducing agent to said patient; and

administering a therapeutically-effective amount of a telomerase inhibitory agent to said patient, such that treatment of the cancer is achieved.

41. The method of claim 40, wherein the method further comprises identifying a patient having, or about to have, a cancer.

42. A method of treating cancer in a patient comprising,

obtaining an agent selected from the group consisting of a telomere damage-inducing agent and a telomerase inhibitory agent;

administering a therapeutically-effective amount of a telomere damage-inducing agent to said patient; and

administering a therapeutically-effective amount of a telomerase inhibitory agent to said patient, such that treatment of the cancer is achieved.

43. The method of claim 42, wherein the method further comprises identifying a patient having, or about to have, a cancer.

44. The method of any one of claims 40 or 42, wherein said telomere damage-inducing agent is paclitaxel, or a derivative thereof.

45. The method of any one of claims 40 or 42, wherein said telomerase inhibitory agent is a nucleotide analog, or derivative thereof.

46. The method of claim 45, wherein said nucleotide analog is AZT.

47. The method of claim 45, wherein said nucleotide analog is d4T.

48. The method of any one of claims 40 or 42, wherein said telomerase inhibitory agent is an antisense nucleic acid corresponding to a telomerase.

49. A method of enhancing the efficacy of a chemotherapeutic agent comprising,

administering a chemotherapeutic agent to a cell in the presence of a telomerase inhibitory agent, whereby the efficacy of the chemotherapeutic agent is increased as compared to a control.

50. A method of reducing or inhibiting the resistance of a cell to an anticancer agent comprising,

administering an anticancer agent to a cell in the presence of a telomerase inhibitory agent, whereby the resistance of said cell to said anticancer agent is decreased as compared to a control.

51. The method of claims 49 or 50, wherein said anticancer agent is a telomere damage-inducing agent.

52. The method of claim 51, wherein said telomere damage-inducing agent is paclitaxel.

53. The method of claims 49 or 50, wherein said telomerase inhibitory agent is a nucleotide analog or derivative thereof.

54. The method of claim 53, wherein said nucleotide analog is AZT.

55. The method of claim 53, wherein said nucleotide analog is d4T.

56. The method of claims 49 or 50, wherein said telomerase inhibitory agent is an antisense nucleic acid corresponding to a telomerase.

57. A method for detecting telomerase activity in cell extract comprising:

incubating a reaction mixture comprising a cell extract, a nucleic acid substrate for a telomerase, and nucleotide triphosphates for a time sufficient for the nucleic acid substrate to be polymerized;

contacting the substrate with at least one nucleic acid primer and subjecting the substrate to a polymerase chain reaction; and

detecting the presence of polymerase chain reaction products to detect thereby telomerase activity in said cell extract.

58. The method of claim 57, wherein the cell extract is derived from a cell that has been contacted with an agent.

59. The method of claim 57, wherein the method further comprises contacting the cell extract with an agent.

60. The method of claim 57, wherein the agent is a telomerase inhibitory agent.

61. The method of claim 60, wherein the telomerase inhibitory agent is AZT.

62. The method of claim 60, wherein the telomerase inhibitory agent is d4T.

63. The method of claim 57, wherein the telomerase inhibitory agent is an antisense nucleic acid corresponding to a telomerase.

64. The method of claim 57, wherein the cell extract is derived from a human cell.

65. The method of claim 59, wherein the nucleic acid substrate comprises the sequence provided in SEQ ID NO: 10.

66. The method of claim 59, wherein the nucleic acid primer comprises the sequence provided in SEQ ID NOS: 1 and 2.

67. The method of claim 59 wherein the nucleic acid primer is labeled with a radioisotope.

68. The method of claim 59 wherein said nucleic acid primer is labeled with a fluorescent label.

69. A method for determining telomere length comprising:
hybridizing telomeric DNA fragments with a telomere probe; and
determining the amount of hybridized telomere probe present, whereby the amount of hybridized telomere probe present is an indication of telomere length.

70. The method of claim 69, wherein the telomeric DNA fragments are produced using a restriction enzyme.

71. The method of claim 70, wherein the restriction enzyme or enzymes is selected from the group consisting of *Hinf*I, *Hae*III, and *Hha*I.

72. The method of claim 69, wherein the telomeric DNA is derived from a cell.

73. The method of claim 69, wherein the cell has been contacted with an agent.

74. The method of claim 73, wherein the agent is a telomerase inhibitory agent.

75. The method of claim 74, wherein the telomerase inhibitory agent is AZT.

76. The method of claim 74, wherein the telomerase inhibitory agent is d4T.

77. The method of claim 74, wherein the telomerase inhibitory agent is an antisense nucleic acid corresponding to a telomerase.

78. The method of claim 72, wherein the cell is from a human.

79. The method of claim 69, wherein the telomere probe comprises the sequence provided in SEQ ID NO: 10.

80. The method of claim 69, wherein the telomere probe comprises the sequence provided in SEQ ID NO: 11.

81. The method of claim 69, wherein the telomere probe is labeled with a radioisotope.

82. The method of claim 69, wherein the telomere probe is labeled with a fluorescent label.

83. The method of claim 1, wherein said telomere damage inducing agent is formulated as a nanoparticle comprising a cross linked gelatin.

84. The method of claim 1, wherein said telomerase inhibitory agent is formulated as a nanoparticle comprising a cross linked gelatin.

85. The method of any one of claims 83 or 84, wherein said nanoparticle is about 500 nm to about 1μm in diameter.

86. The method of claim 1, wherein said telomere damage inducing agent is formulated as a microparticle.

87. The method of claim 1, wherein said telomerase inhibitory agent is formulated as a microparticle.

88. The method of any one of claims 86 or 87, wherein said microparticle is about 1 μm to about 10 μm in diameter.

89. A method of identifying a telomerase inhibitory agent comprising:

contacting a cell with an agent;

incubating a reaction mixture comprising an extract of said cell, a nucleic acid substrate for a telomerase, and nucleotide triphosphates for a time sufficient for the nucleic acid substrate to be polymerized;

contacting the substrate with at least one nucleic acid primer and subjecting the substrate to a polymerase chain reaction; and

detecting a decrease in the presence of polymerase chain reaction products to thereby identify a telomerase inhibitory agent.

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